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Origin of Metallic Veins.

The following is taken from "Hitchcock's Geology":

1. Werner supposed that metallic veins were fissures filled by aqueous infiltration from above.

2. Hutton supposed that metallic veins were filled by melted matter injected from beneath. It is probable that many metallic veins were thus produced.

3. Professor Sedgwick supposes some metallic veins to have been produced by chemical segregation from the rock in which they occur, while that was in a yielding state; just as nodules of flint were segregated from chalk, or crystals of simple minerals from the rocks in which they are now found imbedded.

4. Mr. Fox and M. Becquerel refer the origin of many metallic veins to electro-chemical agencies which are operating at the present day, to transfer the contents of veins even from the solid rocks in which they are disseminated, into fissures in the same. The former of these gentlemen has shown conclusively that the materials of metallic veins, arranged as they are in the earth, are capable of exerting a feeble electro magnetic influence; that is, they constitute galvanic circuits, whereby numerous decompositions and recompositions, and a transfer of elements to a considerable distance may be effected. He was induced to commence experiments on this subject by the analogy which he perceived between the arrangements of mineral veins and voltaic combinations. And he thinks if such an agency be admitted in the earth, it shows why metallic veins, having a nearly east and west direction, are richer in ore than in others; since electro-magnetic currents would more readily pass in an east and west than in a north and south direction, in consequence of the magnetism of the earth. M. Becquerel has shown that even insoluble metallic compounds may be produced by the slow and long-continued reaction and transference of the elements of soluble compounds by galvanic action. He has also made an important practical application of these principles, which is said to be in successful operation in France, whereby the ores of silver, lead and copper are reduced without the use of mercury. This ingenious theory bids fair to solve many perplexing enigmas relating to metallic veins, and to prove that some of them may even now be in a course of formation.

5. M. Neckar and Dr. Buckland suggest that some mineral veins may have been filled by the sublimation of their contents into fissures and cavities of the superincumbent rocks, by means of intensely-heated mineral matter beneath. Thus it has been shown that by heating galena in a tube, and causing its vapor to unite with that of water, a new deposition of that mineral was produced in the upper part of the tube; and in a similar manner boracic acid, which by itself does not sublime, may be carried upward and deposited anew.

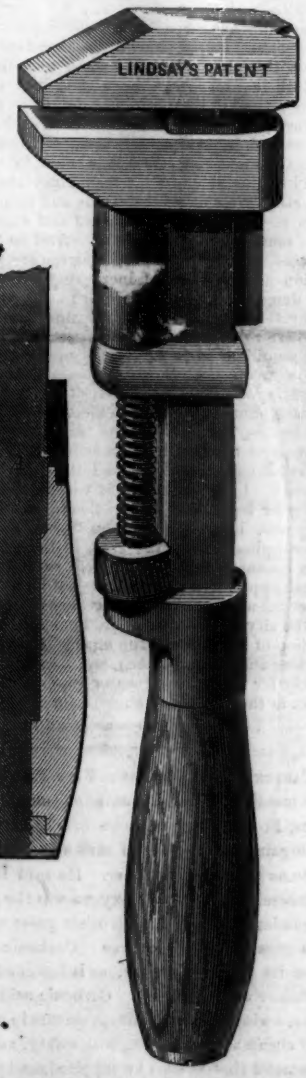
Probably it will be necessary to call in the aid of all the preceding hypotheses to explain the complicated phenomena of mineral veins. The third and fifth of these hypotheses meet with the greatest favor with eologists at the present day.

Lindsay's Improved Screw Wrench.

There is no article of more universal application, or of more practical utility in the hands of a mechanic probably, than the screw wrench.

As the hammer is to the worker in wood, so is the wrench the *sine qua non* to the worker in iron or machinery. Without it the engineer would be quite as much at fault as the mariner without a compass. It may be called the rudder of the mechanical ship, and its accidental breaking or loss will often place an entire mechanical establishment in disorder, and produce equal consternation among the employés, as the loss of the former would among the officers, passengers and crew of a ship in a white squall at sea.

Fig. 1



LINDSAY'S IMPROVED SCREW WRENCH.

Numberless inventions have been devised to improve the wrench in durability, strength and scope of its application; most of them have failed owing to some fundamental mechanical imperfection, as a weakness of some part, a too great complication or cumbersomeness, and a want of adaptability.

We herewith give an excellent engraving of Lindsay's Improved Screw Wrench, which the reader will understand at a glance. The supplementary cut (fig. 2) shows the iron shaft, A, passing quite through the handle, E, and secured by the nut C. D is the thumb screw which operates the jaws. The principle features of this wrench consists in the strengthening rib on the back (see cut), which is forged with the bar and prevents the same from bending or breaking. All the parts are case hardened and are interchangable as in gun work. In fine, the article may be said to be perfect in its workmanship throughout.

John Ashcroft, Esq., No. 50 John street, manufactures and supplies the trade with this really excellent article, at the rate of five hundred every twenty-four hours. Parties desirous of further information will please call upon or address as above.

THE NEW STREET-LAMPS IN DUBLIN.—The Alliance and Dublin Consumers Gas Company, in accordance with their engagement with the corporation, are now exchanging the old heavy looking gas-lanterns for new and elegant ones, from plans and designs registered by Mr. Cotton, the corporation inspector of public lighting. During the present week several streets have at night presented a very brilliant appearance in consequence of this alteration; and when the whole city is similarly lighted, a very decided improvement will be obtained in the illumination of the streets. The lanterns are six-sided, with three wrought-iron bars to support the glass, and secured to a tripod. The shadow thrown upon the ground is consequently much lessened, the old heavy cradle and side bars being dispensed with. By a simple and effective arrangement the lamps are lighted and extinguished without the aid of a ladder. The pillars are of a graceful shape, the base forming a box containing a meter, in accordance with the plans of Mr. Cotton, to whom must be accorded the merit of introducing this improved system of public lighting. The whole of the contract has been executed in Dublin, the lanterns and meters being made at the Irish Meter Manufactory, Hanover street. We may congratulate the public as well as the corporation on this change, which is a decided improvement on the old lamps, and adds considerably to the illumination of the streets. The plan, as well as the manner in which they have been put out of hand, reflects most creditably on all parties concerned; but in this latest city improvement a prominent place must justly be accorded Mr. Cotton, the efficient officer of the corporation, whose ingenuity and practical experience have produced an improvement in the public lighting, the necessity of which was long felt by the citizens.—*Freemen's Journal.*

—The New York Central Railroad is about to import steel rails for two miles of track.

The Water Supply of Our Great Cities.

BY REV. JOHN W. MEARS.

[Published by order of the Water Committee of the Councils of Philadelphia.]

SCANTY SUPPLY OF LONDON—ITS BEARING ON PUBLIC MORALS.

A subject so bound up with comfort, cleanliness, health, and good morals, as the abundant supply of pure water to our great and growing cities, will be regarded as not unsuitable for discussion in the columns of a religious newspaper. The painfully stinted supply doled out to the abject poor of London, undoubtedly forms a serious obstacle to their elevation in many ways. No one who informs himself of the facts in the case, as they have been stated by a writer in the last number of the *Edinburg Review*, will wonder at the degradation, the drunkenness and the Sabbath-breaking, which accompany their poverty, and make it so hideous and so hopeless. The very class of persons whose occupations render necessary a large amount of water to personal cleanliness; whose dwellings, from their crowded condition, must need frequent cleansings, to keep them from becoming like the dens and styes of beasts, are the most restricted in their use of the means of ablution. The inadequate supplies and the filthy condition of the water furnished to our captive soldiers in the South, during the late rebellion, has been matter of just execration; but we must conclude, that the men who famished in the Andersonville pen, were no worse off for pure water, than are thousands of the poorer inhabitants of the great Christian city of London, at the present day.

Our space does not permit us to present the dreadful facts as fully as we might wish. The best of the houses in these miserable neighborhoods are supplied with wooden cisterns, which, if regularly filled—about which there is some doubt—would allow each inhabitant an average of four gallons in twenty-four hours for all purposes. (In Philadelphia, the average to each inhabitant is forty-five gallons.) Moreover, nine-tenths of these cisterns are without covers, and one half of them are so placed as to catch the foul drippings from the eaves of the houses, and are lined internally with scum and slimy vegetation. Not a few are so rotten that the finger can be pushed through them, and the contents of those that are tight, become every hour more offensive and unlike what water should be, for purposes of cleanliness and consumption.

Another mode of supplying these poorer quarters is by turning on water from the street pipes for a certain length of time every day. At that time, all who want water must be in attendance, with such articles as they can command. For *twenty minutes* a half-inch stream is allowed to run. "In the afternoon, those who pass that way may see, in looking up the narrow entrances of these courts, crowds of women and children, provided with bottles, pails, tubs, teakettles, broken jugs and other vessels. These people will tell you that they have not a drop of water in their houses. . . . . At length the water issues from a lead pipe of not more than half an inch in diameter. So small is the stream, that it is difficult even for those who are provided with proper vessels to get what is wanted, and some are so ill off in this respect, that they are not able to collect more than a gallon of water. . . . In some of the dark courts and lanes, pure water is as scarce as it is on board an emigrant ship during a long voyage."

Worse still, there are whole days in which there is absolutely not a drop of water to be obtained, and these days, of all others in the week, are those in which the abject poor would feel disposed and at leisure for some attempt at personal cleanliness. From Saturday afternoon at three o'clock, until Monday afternoon at the same hour, there are neighborhoods without a supply. Sometimes a whole court has to borrow from a "Public" at the corner. Three or four gallons of water must be made to last an individual, for every purpose, forty-eight hours! In a tenement neighborhood near Covent Garden, the poor creatures were described as actually famished for water in this Sunday drought. The premises belong to "eminent brewers"—men who not only convert much pure water into a means of dissipation, but who corrupt much more by the more process of manufacture. Any one noticing the gutters near a brewery, flushed with turbid and offensive streams, may learn what poisoners of nature's beverage they are.

Who can doubt that there is a close connection between these facts, and the notoriously degraded condition of the London poor? Who can doubt that the squalor of their homes often drives them to the better conditioned gin shop; or, that when a healthful drink is almost impossible to be had, a stimulant is used in its stead? Who can avoid the suspicion that those "eminent brewers" already mentioned, stint their tenants of water, so that their appetite for beer may be kept at the highest available point? We believe it has long ago been settled, that an abundant supply of pure water greatly promotes temperate habits among the masses.

The relation of water supply to progress is shown in the fact that the demand for water in our cities increases in a far higher ratio than would result from the increase of the population. "Not only does every additional person need a certain quantity, but every individual tends to require more water than any of his predecessors. The diffusion of care and cleanliness of body makes one man use perhaps twice as much water as any of his ancestors, and the more confidently men believe that cleanliness is next to godliness, the more ample will be their ablutions." Facts in regard to the amount of water used by former generations cannot be obtained; but we trace the effect of the increase "in the remarkable diminution in certain once prevalent diseases." In Glasgow, in 1838, twenty-six gallons a day was considered a liberal supply for each individual. In 1845 it rose to thirty gallons: in 1852 to thirty-five and thirty-eight gallons, and now, since Loch Katrine has been put to the practical purpose of a water supply, forty-five gallons are delivered, on an average, to every man, woman and child in the city. In London, the average is twenty-six gallons at the present time. In Philadelphia, in 1830, it was twelve and a half gallons; in 1861, it was forty-one gallons; it is now stated to be forty-five. Part of this increase is doubtless due to the increase of manufactories, requiring water for the generation of steam, and for a multitude of other purposes; but much is due to the increasing appreciation by individuals of the great comfort and moral value of an abundant water supply, when thus bountifully brought to their doors. They and their homes can be clean; it is their fault and their shame if they are not. A river of bright, pure water, poured in thousands of branches along every street and by every door, is a truly delightful persuasive to something very near akin to virtue. People yield to the persuasive; they luxuriate in the cheaply got cleanliness of their persons and homes. The filthier ones around them are shamed and stimulated. They too, must have their share. And so the demand increases, and civilization and virtue are promoted in the action and re-action of increasing supply and increasing demand; it being difficult to apportion the praise accurately between the supply and demand.

There is a great deal of cant uttered by infidel bigots and would be social reformers and materialist philosophers, upon the proper methods of ameliorating and elevating the social condition of the masses. Our missionary efforts, directed at the spiritual wants of these multitudes, are decried, and methods of outward improvement are extolled as worthy the first place in such undertakings. Let us not be loth to learn even from our enemies. Let us admit, that while myriads of the London poor have but two or three gallons apiece for all purposes, in one day, and on Sabbath none at all, or are supplied from filthy vats, little better than sewers, it is visionary to hope for great results from bare spiritual appliances. And it would be a legitimate and practical undertaking for the benevolent Christian men of the city, not only for Mr. Peabody, but also for the Bishop of London and the multiplied evangelical organizations among churchmen and dissenters, to move earnestly for an increased water supply, as a powerful adjunct in the work of evangelization.

(To be continued.)

CARBONIC ACID GAS AS A FIRE EXTINGUISHER.—At a late meeting of the Commission on Life-saving inventions, Prof. Doremus spoke briefly on the advantages to be gained by the use of carbonic acid gas in a liquid state as a fire extinguisher. He said that it was now universally known that oxygen was the great supporter of combustion, and that all other gases were its enemies in a greater or less degree. Carbonic acid was perhaps its greatest enemy, as it lessened its value as a sustainer of combustion. Carbonic acid gas in a liquid state, owing to recent improvements in its manufacture, was cheap and portable, with safety, and he would recommend that vessels be supplied, and placed on board ships and ferryboats or elsewhere where many lives were in danger. A supply of this gas available through lengths of hose reaching from end to end of a ship could not fail to be of immense service in extinguishing fires in their inception. He would not say that it would always prove successful, for in cases where windows and doors, or hatchways or other sources of supply were thrown open, and fresh oxygen admitted *ad libitum*, the gas might effect its purpose. He, however, believed that misfortune might often be avoided and human life saved by a proper attention to such an apparatus as that he suggested.

On the Generation of Coal Gas.

[From "Clegg on the Manufacture of Coal Gas."]

The common process of making gas is too well known to require consideration here, and the methods of purification being described in another part of this work need not be now discussed; there are, however, some chemical considerations of a general character connected with the generation of gas which may be now appropriately brought forward.

According to Playfair, the temperature of boiling mercury (662°) only causes the evolution of water, and a distinct empyreumatic odor from coal. At the point at which zinc melts (773°), more water and a minute quantity of oil escapes. At a red heat just visible in a dark room (980°) much oil is evolved. At a cherry red heat (about 1500°) highly illuminating gas is produced, and at a full red (about 1800°) and low white heat gas of poor quality for lighting purposes is given off. The effect of heat on coal differs somewhat, according to the nature of the coal, common gas-coal yielding best at a cherry-red, and cannel at a full red heat. Above these temperatures the proportion of sulphur compounds increases rapidly.

The constituents of purified coal-gas are hydrogen, light carburetted hydrogen, carbonic oxide, olefiant gas, other illuminating gases having the general formula $Cn\ Hn2$—that is, containing half the number of atoms of carbon as of hydrogen, like olefiant gas; further, the vapors of hydrocarbons having the formula $Cn\ H_{(n2-6)}$, as benzole and probably other hydro-carbons whose composition is not yet known. In addition to these, there are also present small quantities of nitrogen, oxygen and bisulphide of carbon vapor, which however, for our present purpose, may be entirely neglected.

It has generally been assumed that hydrogen and carbonic oxide possess no illuminating power, and that the light afforded by coal-gas is due to light carburetted hydrogen, olefiant gas, and other hydro-carbons. But late experiments have proved that light carburetted hydrogen possesses, in a practical point of view, no illuminating power whatever; and we must therefore ascribe all the light of coal gas to the olefiant gas and hydro-carbons contained in it, whilst the relative proportions of hydrogen, light carburetted hydrogen, and carbonic oxide, with which these luminiferous ingredients are diluted, exercise no beneficial influence upon the amount of light yielded by a given volume of these illuminating compounds.

The constituents of coal-gas, and also of other gases used for illuminating purposes, may therefore be divided into two classes, viz., luminous and non-luminous constituents. To the first belong olefiant gas and the rest of the hydro-carbons mentioned above, except perhaps napthaline, about the illuminating power of which there is some difference of opinion; to the second, hydrogen, carbonic oxide, and light carburetted hydrogen. To the first class alone is the illuminating power of every gaseous mixture due, but at least one member of the second class is also indispensable, since otherwise the combustion of the hydro-carbons, without the production of much smoke and a consequent loss of light, would be attended with great difficulty. The members of the first class are all instantaneously decomposed at a white heat. They all deposit their carbon at that temperature in the form of exceedingly fine particles, which constitute so many centres for the radiation of light in the flame of a gas-light. The greater the number of such particles that are at any moment present in a flame, the greater is the amount of light emitted by that flame. These considerations render it evident that the value of the gaseous and liquid hydro-carbons as light-yielding materials is in direct proportion to the quanuity of carbon contained in a given volume; the densest of the gases or vapors of the first class are therefore those which possess the highest illuminating power. All the members of this class are however, as just mentioned, more or less rapidly decomposed at a red heat, and in the usual process of gas-making the inner walls of the retorts soon become covered with a layer of carbon derived from this source. This destruction of luminiferous constituents is dependent, on the one hand, upon the length of time during which they are exposed to a high temperature, and on the other, upon the number of the particles of such constituents which come in contact with the red-hot sides of the retort.

Two methods therefore suggest themselves for the prevention of this decomposition. The first would consist in the rapid removal of the gases from the retort, and the second in the dilution of the luminous gases by an admixture of non-luminous constituents; for it is

evident that the number of atoms of illuminating gas, in contact with a given surface, would only be half as great if that gas were diluted with an equal volume of hydrogen as it would be without such admixture The first method is accomplished by the use of exhausters, and both methods in White's hydrocarbon process, in which a current of non-luminous gas at once dilutes and removes the richly luminiferous constituents from the deleterious influence of the heat. Mechanical difficulties however have hitherto prevented the principles on which the latter process is based from being practically applied.

The importance of restricting the time during which the coal is subjected to the action of heat in the manufacture of gas is illustrated in the following table, by Miller, which exhibits the amount and specific gravity of the gas obtained from two bushels of coal during each of five hours heating in an ordinary retort. The rich hydrocarbons diminished, and carbonic oxide and hydrogen increased in quantity as the experiment progressed.

	Cubic feet.	Specific gravity.
In the first hour.....	345	0.677
" second "	203	0.419
" third "	118	0.400
" fourth "	54	0.322
" fifth "	20	

Besides the use of the members of the non-illuminating class which has been already stated, they are valuable as forming a medium for the solution of the vapors of such hydrocarbons as exist in the liquid or even solid state, at the ordinary temperature of the atmosphere; they thus enable us to convert an additional quantity of illuminating materials into the gaseous form, which they retain permanently, unless the temperature fall below the point of saturation. The gain in illuminating power which is thus obtained will be perhaps better seen from the following exa ple. If 100 cubic inches of olefiant gas, being allowed to saturate itself with the vapor of a volatile hydrocarbon containing three times the amount of carbon in a given volume of its vapor as that contained in an equal volume of olefiant gas, took up or dissolved in this way three cubic inches of hydrocarbon vapor, then, if we express the value in illuminating power of one cubic inch of olefiant gas as unity, the illuminating power of the 103 cubic inches of the mixture of olefiant gas and hydrocarbon vapor will be 109. Now if we mix these 103 cubic inches with 100 cubic inches of hydrogen, the mixture will be able to take up an additional three cubic inches of the hydro-carbon vapor, and the illuminating power of the 206 cubic inches will then become 118. Thus the hydrogen produces a gain in illuminating power equal to nine cubic inches of olefiant gas, or nearly 4.5 per cent. upon the total volume of mixed gases. When we consider that coal naphtha contains hydrocarbons of great volatility, and which are no doubt the surplus remaining after the saturation of the gas from which they have condensed, the importance of this function of the non-illuminating class of combustible gases will be sufficiently manifest.

It is evident that all the three non-illuminating gases forming the second class would perform both the offices assigned to them equally well; we have as yet therefore seen no reason for giving our preference to any one of these diluents. If, however, we study their behaviour during combustion, we shall find that where the gas is to be used for illuminating purposes, hydrogen has qualities which give it a decided advantage over the other two. When gas is used for lighting the interior of public buildings and private houses, it is very desirable that it should deteriote the air as little as practicable, or, in other words, it should consume as small a quantity of oxygen, and generate as little carbonic acid as possible; the oppressive heat which is often felt in apartments lighted with gas also exemplifies the great advantage of its generating a minimum amount of heat. The heating powers of hydrogen, light carburetted hydrogen, and carbonic oxide, have been given in the description of each of these gases, and from a comparison of their heating powers, together with the deteriorating effect upon the atmosphere, it will be seen that light carburetted hydrogen is very objectionable as a diluent, not only on account of the carbonic acid which it generat s and the large quantity of oxygen it consumes, but also by reason of the very great amoun of heat which in relation to its volume it evolves on combustion, the absolute thermal effect being more than three times as great as that of either of the other gases. The quantity of heat evolved by the combustion of equal volumes of carbonic oxide and hydrogen is nearly, and the amount of oxygen consumed quite, the same; but the quantity of carbonic acid evolved by the first gives a decided preference to hydrogen as the best diluent The same comparison also shows that where the gas is to be used for heating purposes, and the products of combustion are carried away, light carburetted hydrogen is the best diluent.

These remarks indicate the objects that should be chiefly regarded in the generating department of the manufacture of gas for illuminating purposes These are—

1. The formation of a due proportion of illuminating and non illuminating constituents, so that on the one hand the combustion of the gas shall be perfect, and without the production of smoke or unpleasant odor; and on the other, that the volume of gas required to produce a certain amount of light shall not be too great.

2. The extraction of the largest possible amount of gaseous illuminating compounds from a given weight of materials.

3. The presence of the largest possible proportion of hydrogen amongst the non-illuminating constituents, to the exclusion of light carburetted hydrogen and carbonic oxide, so as to produce the least amount of atmospheric deterioration in the apartments in which the gas is consumed.

Carbon.

The following synopsis of a lecture delivered by Professor Rogers, in the Hall of the University at Philadelphia Feb. 18th, will be found an unusually interesting treatment of the subject. The lecturer began with a description of the earth, from the time when it settled into shape and began its revolutions round the sun. It was composed at first of a few metals, the oxidation of which converted them into earths, and thus formed a crust on its surface. The cooling process went on to a certain depth, great to our minds, but bearing a small proportion to the mass of the entire globe. The deeper we penetrate below the surface the greater is the heat, until, at the depth of some miles, all is converted into an incandescent mass, in which the hardest metals and rocks are fused into a fluid, if not a gaseous state. Great and apparently innumerable as are the substances of which the earth is composed, they are reducible to sixty-six elements; but if we subtract from this list those that are met with only in very small if not insignificant proportions, there would only remain thirteen, and even these might be reduced to five, as representing the great bulk of the earth and its surrounding atmosphere, viz., iron, aluminum, magnesium, calcium and oxygen. The element last named, which forms one-fifth of the atmospheric air, is without smell or taste; it readily enters into combination with other gases and with metals, and in this way makes up a large share—nearly one-half—of the earth's substance. The different earths and rocks are made of the metals combined with the oxygen. Thus aluminum with oxygen gives alum; with magnesium, magnesia; with calcium, lime, etc. In evidence of this readiness of combination, the lecturer took a piece of magnesium, and after heating it he introduced it into a jar of oxygen gas, in which it burned rapidly, while emitting an intense degree of light, leaving as a residuum the earth known as magnesia.

Coming to the more immediate subject of his lecture, Dr. Rogers described carbon and its combinations, which are both curious and of indispensable necessity in the economy of man's support and well-being, and his progress and civilization. Carbon is represented in nearly its entire purity in the brilliant and sparkling diamond, and in a less inviting guise, but for far higher purposes in coal (anthracite and bituminous); in wood charcoal and animal charcoal, by the burning of bones, &c.; in graphite, or black lead, which is made up almost entirely of carbon, with the addition of a small quantity of iron; and in lamp-black. Carbon, combined with oxygen, forms carbonic acid, which is a constituent part of the general atmosphere. With hydrogen gas it is converted into an illuminating gas. The properties of oxygen were again described as a necessary supporter of combustion and of animal life by breathing it. A piece of charcoal, lighted at one end was introduced into a jar containing oxygen gas, with the effect of the former being rapidly burnt with a bright flame and rapidly disappearing. In place of oxygen there was found in the jar carbonic acid. The inverse trial, in the shape of analysis, was next gone through, and the real composition of the carbonic acid gas shown in its being made to pass over potassium, or the metal of potash, which is very greedy of oxygen and absorbed it on this occasion, leaving the carbon free and visible. Carbonic acid gas, in addition to its being found in the atmosphere, abounds in mineral springs, and is emitted from volcanos and in the decomposition of all organized substances. The very opposite of oxygen gas, it extinguishes flame, stops combustion, and if inhaled in any quantity, destroys animal life. Now comes in a beautiful example of the doctrine of compensation and of the harmonies of creation. This same carbonic acid gas, which is continually escaping from the lungs and skin of animals as useless, and the accumulation of which in the air we breathe would be destructive to life, is seized upon with avidity, decomposed and converted into food by the vegetable kingdom. Not only is this gas made harmless by this decomposition, but in yielding up its constituent, oxygen, to the atmosphere, it increases the salubrity of the latter, by adding to the life-giving stock for breathing. The carbon is retained and becomes the food of plants. The mere access of the carbonic acid gas to the vegetable, chiefly to the leaves, is not, however, of itself sufficient without light. This is the genial, vivifying element, wanting which, both vegetable and animal life would pine, sicken and decay. The lecturer dwelt eloquently on the solar origin of light, which, together with heat electricity, magnetism, and galvanism, may be regarded as modifications of one original element or subtle power. No substance in creation is lost, but in its apparent destruction only undergoes a change of form, as in the case of carbon, whether we look at it at one time as a diamond, or coal, converted by combustion into gas, and then see this gas decomposed, feeding by its carbon the vegetable creation, which in its turn feeds the animal, from which again is eliminated the carbonic acid gas that enters into the atmosphere, and furnishes again food for vegetables. Certain plants are partially charged with a large fixation of carbon, and in progress of time have been converted into our fuel in the shape of peat and coal. The lecturer concluded by an experiment seemingly paradoxical, in which he heated a fluid in one vessel and made ice in another, the two vessels being connected by a tube transmitting ammoniacal gas in both directions.—*Jour. Applied Chem.*

Paper Pipes and Cisterns.

The London *Railway News* says: "Railway companies suffer, in common with private individuals, from the effects of severe frost, in the bursting of the pipes and cisterns from which they derive their supply of water. It may interest railway managers and others to know that pipes and cisterns may be made of a material which effectually resists the frost, and strange as it may appear, the material employed is paper. The severe frost in the last two or three months has afforded abundant opportunity of confirming the opinion expressed by Mr. Szerelmey, that the materials which he employs render the paper a perfect non-conductor, and that as such, it will resist the action of frost. In the open yard of his factory at the Albion Works, near Battersea Bridge, there has been during the last fortnight one large brick tank, containing several tons of water, the ice upon which was several inches thick. By the side of this was another made of paper boards, in which the water was not the least frozen. Some iron pipes, which supplied water to the boiler of the engine-house from the large cistern, burst in several places in the thawing of the frozen water which they contained. Some paper pipes, on the other hand, filled with water, and which have been exposed in the snow on the ground, perfectly kept the water from freezing.

"In a model house or hut, made of paper, and which is erected on the open space, some water in open bowls and pails did not freeze, though outside the building there were large masses of ice. The encaustic colors with which the exterior of the paper house has been painted, and which has also been applied to brick, iron, stone timber and a variety of other materials, retained their peculiar brightness and brilliancy throughout the whole period of the continued frost These very practical and severe tests would seem to establish very fully the value of the process. If water does not freeze under the conditions referred to, a very large amount of that discomfort and annoyance so generally experienced at the time of frost and thaw, would be arrested by the substitution of these paper pipes and cisterns for the ordinary ones of lead or iron"

—A remarkable discovery is reported in Italy, by which two persons may converse by telegraph, recognizing even the sound of each other's voice.

Progress of Science.

Coal Superseded as Fuel for Steam Engines—Successful Experiments at the Navy Yard—Petroleum as Fuel—Enormous Saving in Space—Utility, Safety, Economy—Immense Advantage to Steam Navigation.

[From the Boston Commercial Bulletin.]

During the last twenty years, as steamers have increased in numbers, and have been steadily taking the place of sailing vessels on coastwise and other short voyages, and to a great extent for the transportation of passengers and freights to and from Europe, most earnest efforts have been made by engineers and other scientific men, to discover the best method of economizing fuel. For this purpose, propellers are superseding side-wheel steamers, and the merits of all kinds of boilers have been tested and discussed.

To the present Chief of the Bureau of Steam Engineering in the United States Navy, B. F. Isherwood, the commercial world owes much for very valuable information on this point. Quick of apprehension, clear of thought, prompt to act, he has kept a watchful eye upon all matters affecting steam navigation, and has demonstrated by experiment the value or worthless ness of hundreds of claims. That he has made some mistakes is true, but that he has developed more facts in engineering than almost any other man now living, is also true.

But all the researches of talent and experiment have failed to reduce the amount of fuel required so as to enable steamers to make long voages without frequently coaling, or to make them at all to distant parts of the globe, without first transporting coal by sailing vessels, to various points along the route, where the steamer can call and take it; and thus all commerce around Cape Horn and the Cape of Good Hope, is practically left to slow sailing vessels. The difficulty is not so much in the expense of coal, although its increasing scarcity and cost cause grave apprehension, as in the great bulk and tonnage occupied. In fact, nearly one half of the carrying capacity of European steamers, and more than that on longer voyages, is taken up by the fuel transported.

The high price of all vegetable and animal oils, of course, prevented any efforts to introduce them into use. But soon after the discovery of large amounts of petroleum in this and other countries, attention was called to its great calorific power, and constant efforts have been made to utilize it as a heat generator in steam boilers. It is generally agreed that the heating power of petroleum is about four times as great as that of anthracite coal, of equal weight and bulk, if both could be wholly burned, and all the heat utilized. But experiments have shown that in coal, after deducting ashes, clinker, dust, the gases lost in smoke, only about one half of the heat therein can be practically used; so that if any expedient can be devised whereby all the heating power of petroleum could be saved, a gain of some eight or ten to one would be effected.

With this view experiments are now being made in the dockyards of England and France, also in the Navy Yard at New York, and by private individuals in various parts of this country. We have watched these experiments with great interest, but have refrained from expressing any opinion, because in all the reports of the trials both in Europe and here, the results have been unsatisfactory. The fires have been imperfect, have smoked and been dangerous and difficult to manage.

The difficulty which has so long troubled merchants and engineers, seems now in a fair way to be solved, and it has been demonstrated almost to a certainty, that another great discovery has been made, which will be of vast importance to the world, and create an entire revolution in the method of heating marine and locomotive boilers—a discovery which has amazed us by its simplicity of action, and the great advantages it possesses over all the methods now in use for safety, economy, volume of heat and tractability.

Last fall, Col. Henry R. Foote, of Tennessee, who commanded a Union regiment in the late war, patented an invention for burning petroleum in steam boilers, upon which he has been at work some two years, and on which he has spent many thousand dollars. Col. Foote associated with him Mr. J. H. Winsor, of Pennsylvania, and they came to Boston, and set up a locomotive boiler in a little building on Chardon street, and for several months ran an engine with this new fire. During this time they made the acquaintance of Stillman B. Allen, Esq., of this city, who is well known as having energy and determination, which rarely fail to accomplish whatever he undertakes, and he became a joint owner with them in the invention, and has entire charge of all the business arrangements of the concern. He called the attention of the Navy Department to the subject, and forwarded certificates from Alban C. Stimers, of New York, a well-known engineer of high standing; of George B. N. Tower, late Chief Engineer U. S. N., and Chief of Marine Engineering Staff at Charleston, and of unquestioned ability; of Capt. Anderson of the Cunard steamer Africa, and of Governor Andrew, Professor Rogers, and several engineers who had examined the fire on Chardon street.

Mr. Isherwood at once ordered a board of three chief engineers to examine the apparatus. They did so and reported most favorably, and recommended that it be at once placed on board some steamer in the Navy. An order was then issued to fit up the iron steamer Palos, a beautiful little gunboat of the fourth class, at the Navy Yard here, for full and complete experiments, and Alexander Henderson, Chief Engineer of the Navy Yard, an energetic, accomplished and skilful officer was appointed President of a Board for experiment, consisting of himself and Chief Engineers Moore, Baker and Kellogg, and eight Assistant Engineers.

Their experiments are now in progress.

(To be continued.)

Purifying Gas by Iron Ore.

This invention, which has been introduced with great success in almost all the gas works in Denmark, is based on the following process: The hydrated peroxyd of iron decomposes the ammonium and sulphureted hydrogen contained in the gas, and forms sulphuret of iron, and therefore the gas is purified from sulphur just as well as by the use of lime. This method has the advantage that, as the peroxyd of iron combines with sulphur, even when the gas is hot, it is not necessary to use a condenser, and if the purifiers are large enough, not even the scrubbing or cleaning with water is required, which is of great importance, as the gas will lose much of its illuminating power by a too quick condensation, and its coming in contact with water the accumulation of naphthaline is also diminished. The purifying material can be used over and over again, as long as there is anything left of it. When the material in a purifier is spent, it is placed in a receptacle with a water-tight bottom and washed out with gas or ammonium water, which is poured over the material by a hose. After having passed through, the water is conducted to a water-tight tank. By this process the sulphur combines with the iron, and when evaporated sulphate of ammonia will remain. The following statement, obtained from the Copenhagen Gas Works, will show the advantage of this invention. The coals used were New Pelton, Gesmahago Cannel and Boghead Cannel:

One ton of coal gives 10,000 feet of gas, and at the same time 10 lbs. of sulphate of ammonia is obtained; for a quantity of 160,000.000 cubic feet of gas manufactured, 256,000 lbs. of sulphate of ammonia; was sold at $6 per 100 lbs. or $15,360; the cost of producing this salt, not including the necessary operatives in the purifying house, are for two men, $3.50; stoker, per night, $2; coal for evaporating, $2.25; 120 lbs. of sulphuric acid, $1.15—total, $9. The quantity of sulphate of ammonia thereby produced was 500 lbs. at a cost of $1.80 per 100 lbs.

This shows that while the present mode of purifying gas is expensive, by this improved process an actual profit arises. The expenses for altering gas works to this new purifying are very small on works where dry lime purifiers are used, as these can be altered with a trifling outlay. This purifying process is the invention of T. C. G. Hewitz, gas engineer at Copenhagen, Denmark.—*Journal Ap. Chem.*

Enameling Iron.

Enameling iron is almost a new art. No metal is capable of receiving a coating of vitrified porcelain or enamel unless it is capable of withstanding a red heat in a furnace. Articles of cast-iron, as a preparation for enameling, are first heated to a low red heat in a furnace, with sand placed between them, and they are kept at this temperature for half an hour, after which they must be allowed to cool very slowly so as to anneal them. They are then subjected to a scouring operation with sand in warm diluted sulphuric or muriatic acid, then washed and dried, when they are ready for the first coat of enamel. This is made with 6 parts by weight of flint glass broken in small pieces, 3 parts of borax, 1 of red lead, and 1 of the oxyd of tin. These substances are first reduced to powder in a mortar, then subjected to a deep red heat for four hours in a crucible placed in a furnace, during which period they are frequently stirred to mix them thoroughly; then toward the end of the heating operation the temperature is raised so as to fuse them partially, when they are removed in a pasty condition and plunged into cold water. The sudden cooling renders the mixture very brittle and easily reduced to powder, in which condition it is called frit. One part of this frit by weight is mixed with two parts of calcined bone-dust, and ground together with water until it becomes so comminuted that no grit will be sensible to the touch when rubbed between the thumb and finger. It is then strained through a fine cloth, and should be about the consistency of cream. A suitable quantity of this semi-liquid is then poured with a spoon over the iron article, which should be warmed to be enameled, or, if there is a sufficient quantity, the iron may be dipped into it and slightly stirred, to remove all air bubbles and permit the composition to adhere smoothly to the entire surface. The iron article thus treated is then allowed to stand until its coating is so dry that it will not drip off, when it is placed in a suitable oven, to be heated to 180° Fahr., where it is kept until all the moisture is driven off. This is the first coat; it must be carefully put on, and no bare spots must be left on it. When perfectly dry the articles so coated are placed on a tray separate from one another, and when the muffle in the furnace is raised to a red heat they are placed within it and subjected to a vitrifying temperature. The furnace used is similar to that used for baking porcelain This furnace is open for inspection, and when the enamel coat is partially fused the articles are withdrawn and laid down upon a flat iron plate to cool and thus they have obtained their first coat of dull white enamel called biscuit. When perfectly cool they are wet with clean soft water, and a second coat applied like the first, but the composition is different, as it consists of 32 parts by weight of calcined bone, 16 parts of China clay, and 14 parts of feldspar. These are ground together, then made into a paste, with 8 parts of carbonate of potash dissolved in water, and the whole fired together for three hours in a reverberatory furnace, after which the compound thus obtained is reduced to frit and mixed with 16 parts of flint glass, 5½ of calcined bone, and 3 of calcined flint, and all ground to a creamy consistency with water, like the preparation of the first coat. The articles are treated and fired again as described in the preparation coat, and after they come out of the furnace they resemble white earthenware. Having been twice coated, they now receive another coat and firing, to make them resemble porcelain. The composition for this purpose consists of 4 parts by weight of feldspar, 4 of clear sand, 4 of carbonate of potash, 6 of borax, and 1 each of oxyd of tin, nitre, arsenic and fine chalk. These are roasted and fritted as before described, and then 16 parts of it are mixed with the second enamel composition described, excepting the 16 parts of flint glass, which is left out. The application and firing are performed as in the other two operations, but the heat of vitrification is elevated so as to fuse the third and second coats into one, which leaves a glazed surface, forming a beautiful white enamel. A fourth coat, similar to the third, may be put on if the enamel is not sufficiently thick. The articles may be ornamented like china-ware, by painting col-

ored enamel on the last of the coats, and fusing them on in the furnace. A blue is formed by mixing the oxyd of cobalt with the last named composition; the oxyd of chromium forms a green, the peroxyd of manganese makes a violet, a mixture of the protoxyd of copper and red oxyd of lead a red, the chloride of silver forms a yellow, and equal parts of the oxyd of cobalt, manganese, and copper form a black enamel when fused. The oxyd of copper for red enamel is prepared by boiling equal weights of sugar and acetate of copper in four parts of water. The precipitate which is formed after two hours' moderate heating is a brilliant red. The addition of calcined borax renders all enamels more fusible.—*Mechanics' Magazine.*

Improvement in Water Pipes.

We clip the following, in regard to an improvement in water pipes, from the New York *Herald*, of May 23d, which may be of some interest to our readers:

"An interesting series of experiments took place yesterday at the factory of Messrs. Colwells, Shaw & Williard, Twenty seventh street, North river, in the presence of a number of scientific gentlemen, for the purpose of testing the new patent tin coated lead pipe. The use of lead pipes as water conductors has long been known to be prejudicial to health, as the water imbibes after a time the sugar of lead from contact with the pipe. In order to obviate this chemical change many attempts have been made unsuccessfully for the last fifty years, until very recently. The experiment employed a perfectly symmetrical pipe, which weighs but half the weight per foot of the ordinary lead pipe, and which is coated one-fifth of its diameter with pure tin. The manner in which this operation is performed is very curious. A solid cylinder of tin, which weighs say fifteen pounds, and is bored through to the diameter that the pipe is to be, is placed in a cylinder which is some eight inches in length and diameter. The intermediate space between the mass of tin and the side of the cylinder is then filled with melted lead, which at the point of contact with the tin forms an amalgam, but otherwise the tin and the lead maintain their respective separate substances. A powerful hydraulic press, averaging six hundred tons, is then brought to bear upon the entire mass, and it is forced through an orifice below the cylinder in a continuous length of pipe, whose perfect calibre is maintained by a steel rod which is pressed through it. This pipe on being examined, will be found to consist of two separate and distinct pipes—a tin one with a leaden covering; and the great force that has been called forth to compress them prevents any fear of separation. After the spectators had witnessed the process of manufacture a series of experiments were then gone into to show the other merits which the coated pipe has over the ordinary lead pipe. Each was subjected to bursting pressure from a small hydraulic press, and the following results were obtained:

A leaden pipe of one inch interior diameter and weighing 4 lbs. 11 oz. to the foot, burst at a pressure of 1,000 marked by the tell-tale guage; the coated pipe of the same dimensions, weighing but two lbs. 6 oz. to the foot, did not burst until the dynometer marked 1,150. A three quarter inch lead pipe, weighing 3.8 to the foot, was then experimented on, and burst at 1,200. A tin coated one, weighing 1.12 of the same calibre, burst at 1,275. With every specimen tried it was conclusively shown that the tin coated pipe, besides its not being subject to any chemical change by the action of water, is much stronger, and therein promises the quality of being lighter and less cumbersome. When these experiments were concluded Professors Tillman and Doremus gave short speeches on the detriment occasioned to health by the use of leaden pipes for water, and illustrated their remarks in a practical manner. The company then separated, after passing an agreeable afternoon."

A New Furnace of Great Heating Power.

M. Deville, of Paris, has recently constructed a furnace of extraordinary power. The furnace consists of a flame of coal gas, inclosed in a chamber built of some non-conducting substance, into which a jet of pure oxygen is blown. In this way nothing but the material required for perfect combustion is admitted, thus obviating the objection to the use of common air which involves the necessity of introducing into the furnace a volume of inert nitrogen, much exceeding that of the oxygen consumed. When the cold air (the cold blast) is used, a large portion of the heat generated is thus wasted in heating this large excess of nitrogen, to no purpose, This excess, in volume, is as one of oxygen to four of nitrogen—in weight, four of oxygen to fourteen of nitrogen Hence it has been found highly advantageous to apply the waste heat of the furnace in raising the temperature of the air which feeds the flame, thus forming what is technically called the *hot blast.* The use of pure oxygen is not economical; but where a very high temperature is required, it is indispensable. In Deville's furnace, platinum, the most refractory of the elements, when placed upon a bed of lime and subjected to the flame, is easily melted. About one cubic foot of coal gas and one of oxygen will reduce one pound of this metal. The temperature generated in the Deville furnace has been estimoted to be over 14,000 degrees Fahrenheit, or about five times higher than that required to melt cast iron.

This, it will be perceived, is an approximation to the idea which we advanced, of the *desideratum* of some contrivance by which oxygen might be so cheaply generated as to render economical its application to metallurgical purposes. It appears that with the above furnace, one cubic foot of oxygen (the production of which cannot be a matter of very great cost) is made to reduce *one pound of platinum.* May we not have here an economical application of the idea suggested? If platinum could be readily reduced from its ores by heat, it would certainly seem as though an important point had already been gained. Platinum usually occurs in the form of a mineral alloy, with iron, gold, iridium, copper, etc., from which it is separated only in the wet way, and at great cost. When we have pure platinum, it may be readily drawn or hammered to any desired form, welded, etc.: but it is melted only at a very high heat—a heat quite unattainable in ordinary furnaces. If platinum can be separated from its natural alloys, by a simple furnace operation, it could then, by aid of Deville's furnace, be readily cast into crucibles, and introduced for numerous other useful purposes where it has not heretofore been employed, but where it would be of almost inestimable value in the arts.—*Mining and Scientific Press.*

Brevities.

—A ton of coal yields 10,000 cubic feet of gas, while one cord of wood produced about 98,000 feet.

—The Binghamton *Republican* says a bed of peat has been discovered within the limits of that village, which has been tested to be 20 feet deep without reaching the bottom.

—We notice that a fresh coal field has been discovered in Shropshire, England, which is said to contain many millions of tons of the precious "black diamonds."

—A carpet-slipper manufactory in Boston turns out three hundred pairs per day. It has been in operation for two or three years.

—A ball of iron weighing 1,000 pounds at the level of the sea would be perceived to have lost two pounds of its weight if taken to the top of a mountain four miles high.

—An exchange justly remarks, in speaking of the things America is sending to the Paris Exposition, that taking at least half of them to the World's Capital will be like "sending coals to Newcastle."

—The railroads of this country employ two hundred thousand men, and at least a million of men, women and children depend for their support upon the railroad interest.

—There is a salt well at Tuscarawas county, Ohio, which yields six hundred barrels of water in twenty-four hours, thirty-five gallons of the water making a bushel of salt.

—Wheat has been subjected to a temperature of 100 degrees below zero, and to a temperature of 210 degrees above zero without destroying its germinating properties.

—Chladni found that the velocity of sound was from ten to sixteen times as great in wood as in air. In metals the velocity is between four and sixteen times that of air.

—An iron company at Somerset, Mass., established in 1656, employs from one hundred to two hundred and fifty hands in the manufacture of nails. They turn out from sixty to eighty thousand kegs per annum.

—Underground travelling at London increases at an astonishing rate. The number of passengers carried for the first half of the present year by the Metropolitan underground railway was 16,503,395 against 5,823,437 in 1863 and 7,462,253 in 1855.

Correspondence.

Plastic Slate vs. Fire.

A VERY PRACTICAL TEST.

Plastic slate is made of very finely pulverized slate rock, mixed to a paste with raw coal tar, and spread with a trowel. It solidifies by solar heat, and becomes real slate again without any change in its dimensions. It is not combustible at any time—is a bad conductor, and requires intense heat from other bodies to raise it to a red heat. It is being used in nearly every State of the Union for all kinds of buildings. We have heard of only two buildings covered with it being burned and give the results below:

AMERICAN PAPIER MACHE MANUFACTURING CO.,
Corner of Box street and Union avenue,
Greenpoint, L. I., March 27th, 1867.

Gentlemen: In reply to your inquiries as to "how the plastic slate roof stood the fire on our machine shop which was destroyed last fall," I would say, that it proved itself to be most essentially a fire-proof roof in every respect. The fire raged inside of the shop for over half an hour before any water was played upon it, and the plastic slate roof held the flames down during the whole conflagration; indeed, to such an extent, as to drive them through a belt hole and set fire to our factory adjoining, which building we saved, however, and are now occupying. After the fire, much to the surprise of our employees, many good sized sheets of petrified slate were picked up on the ground. We intend to pull down one of our buildings that was injured, and enlarge it, and for its roof most undoubtedly prefer plastic slate. Very respectfully yours,
J. W. JARBOE, Agent.

SECOND TEST.

TECUMSEH, Michigan, April 3d, 1867.

MESSRS. SLAYTON, TINDALL & CO.:

We hereby certify, that the plastic slate roof on our building saved it from destruction at the burning of the National Hotel in this place, on the 16th of March last. Our building was two stories high, with a flat roof, standing as close to the wooden frame hotel as it could be built, with the gable end of the hotel abutting our building. The peak of the roof was twenty feet above our roof. There was no fire engine at the fire, and the water used had to be brought in common wooden pails, by hand, from private wells and cisterns. After the fire there was a bank of charcoal from the hotel building on the roof of our building some four inches deep. We cheerfully recommend the plastic slate roofing, and if we had had the confidence in it which it proved itself worthy of, our damage would have been much less. Truly yours,
KEYSER & SUTFIN.

TECUMSEH, Michigan, April 3d, 1867.

This is to certify that, as agent of the Phœnix Fire Insurance Co. of Hartford, Conn., I insured the building and contents of Keyser & Satfin, adjoining the National Hotel of this village, which was burned on the 16th of March last. The building was covered with plastic slate roofing, which saved it from destruction, and also saved to the Phœnix Insurance Co. fourteen hundred dollars.
S. C. STACY, Agent at Tecumseh.

On the evening of the 16th of March, the National Hotel in this place was entirely destroyed by fire. It was a well built wooden structure, 64 feet square, two stories high, with a peaked roof, dormor windows, and balustrade in front, and covered with shingles. Abutting its gable on the east was a two story brick building, with a flat roof, covered with plastic slate on felt as usual. The roof of the brick was about twenty feet lower than the comb of the hotel.

The wind carried the flames over and along the front and rear of the brick building so as to envelope it. As it was (in the minds of the citizens present) devoted to destruction, they removed the property it contained, excepting two costly billiard tables, which were much damaged in attempting to remove them, and they were given up as lost. But after a time, seeing no fire in the building, although the window and door frames were ignited and burning and the roof was covered with burning shingles, boards and timbers, that had fallen upon it, while the roof itself was not burning, they were inspired with the hope of saving the building, and as soon as the roof of the hotel had fallen and ladders could be had they mounted to the top of the building. Water, procured from private wells and cisterns, was passed up in common wooden pails, (there being no fire engine in the place) and the burning debris was quenched. It was found that the plastic slate had interposed as a shield and had saved the building. On the side next the hotel they found several inches depth of coals made from burning boards and timbers.

Here follows the signatures of about 100 prominent citizens who certify to the facts as stated.

TECUMSEH, Michigan, April 3d, 1867.

We the undersigned, Agents of various Fire Insurance Companies, do hereby certify that at the burning of the National Hotel, Tecumseh, on the evening of the 16th of March last, plastic slate roofing was put to the most severe test—exposed to a driving fire from the hotel some twenty-five feet above it—boards and timbers falling and burning on it, so that a bank of coals of three to four inches was left on it. It proved itself capable of arresting the fire, and saved the building covered with it from destruction We believe it to be the best fire-proof roof ever used.

J. W. STEPHENS, Agent "Home," N. Y.
S. C. STACY, Agent Phœnix, of Hartford, and Underwriters of N. Y., and Ins. Co of North America.
JOHN CUMMINS, Agent Ætna, Hartford, and International, N. Y.
S. C. LeBARON, Sec'y Farmers' Mutual Fire Insurance Co., Luzerne County.
A. STOCLINGS, Continental, Manhattan, Phenix of Brooklyn, and others.
RICHARD & HEWITT, Agents of City Fire of Hartford and Lorillard of N. Y.
WM. DeMOTT, Agent "Home," New Haven, Conn.
BILLS & BAXTER, Agents, Hartford, New Hartford, Ct.
WM. HAYDEN, Home Marine Insurance Company, N. Y.

—A writer to the Buffals Democrat complains of the orthography of the foreman of a gang of laborers, who, in making out his daily returns, spelt the word shovelling sixteen different ways, viz.: "Schuffling shoflin, shovelin, schouveling, shovling, shovlin, shovelling, choveling, shouvling, schoveling, shuvling, shuvilling, shuveling, shovaling, suvling, chivling."

PATENT CLAIMS

Pertaining to Gas, Mining, Petroleum, Water etc.

FOR THE TWO WEEKS ENDING JUNE 2, 1867.

64,671.—FLAME REGULATOR AND EXTINGUISHER FOR LAMPS.—William H. H. Hinds, Groton, Mass. Ante-dated May 1, 1867.

First. I claim the attaching of two pieces of metal made to close together around or above the flame to a cap to which cap is attached a collar or chimney holder when a chimney is used in such a manner that the said two pieces of metal shall form the vertex or top or a part of the vertex or top of said cap as herein described and as shown in figs. 1 and 2.

Second. The closing and opening of the said two pieces of metal by means of a collar or chimney holder as herein described and as shown in figs. 1 and 2.

64,672.—APPARATUS FOR PRODUCING GAS FROM PETROLEUM.—Heinrich Hirzel, Leipsic, Saxony.

First. I claim the pumps V, and feed pipes Q, feeding the petroleum in a continuous jet to the retorts A, in combination with said retorts substantially as above set forth and described.

Second. The clockwork mechanism N, or its equivalent for working the pumps V, in combination with said pumps operating in the manner and substantially as set forth and described.

Third. The wings R, regulating the clockwork N, in combination with the said clockwork.

Fourth. The condenser E, combined with the connecting tube F, the latter setting into the hydraulic main C, where the bench consists of more than one retort or where only one is employed the condenser E, furnished at its bottom with a hydraulic main substantially as set forth and in the manner described.

Fifth. The hydraulic main C, in combination with the excess pipe or discharging tube O, stand pipes B, bell valves D, and connecting tube F, or their respective equivalents all substantially as set forth and described.

Sixth. The trapped tube I, in combination with the condenser E, and cistern G, substantially as described.

64,681.—PEAT MACHINE.—Charles Luxton Hudson, New Jersey.

I claim the octagon roller in combination with the lever for compressing peat fuel for making bricks, as set forth.

64,684.—STREET LAMP LIGHTER.—M. McGill and Jos. E. Tynan, Paterson, N. J.

We claim a hand lantern constructed as and for the purpose set forth.

64,738.—MODE OF LIGHTING GAS.—W. W. Batchelder, New York City.

First. I claim the mode or process, herein described, of rendering a cord or tape combustible and inflammable by friction, substantially as set forth.

Second. The cord or tape coated with the ingredients and in the manner herein specified.

Third. The application to and combination with a gas burner of otherwise ordinary suitable construction, of a device composed of the following elements, viz.:—

1st. A receptacle for the fuse or igniting cord.

2d. A tube through which the fuse is conveyed from the receptacle to within igniting distance of the gas issuing from the burner.

3d. A friction device to ignite the fuse at the end of the tube.

4th. A feeding mechanism to supply the fuse to be burned.

Fourth. The fuse receptacle made annular so that it may be mounted upon the burner, substantially as set forth.

Fifth. The combination with the receptacle and tube containing and conveying the fuse, as described, of a friction device operated by a rotary spindle, substantially as described and for the purpose set forth.

Sixth. The combination with a rotary spindle, carrying the friction device, of an endless screw and feed rack under the arrangement described, so that by rotating the spindle the said rack shall be revolved and effect the feed of the fuse, substantially as herein shown and specified.

Seventh. In combination with the fuse receptacle and the feed and friction device, I claim the device herein shown and described or the equivalent thereof, for checking the retraction or backward movement of the fuse.

Mining Share Market.

The San Francisco Weekly Stock Circular of April 27, gives the market rates of mining stock as follows:

The improvement in the Mining Share Market, inaugurated some time since, has continued in a very material degree, and nearly all first-class stocks have been actively dealt in this week at higher rates. Recent developments in several claims are regarded with much favor, and more confidence in the future value of the Comstock lode is now felt than for a year past. The present fine weather has greatly improved the roads, giving teamsters active employment in carrying the ore to the different mills.

HALE & NORCROSS.—No sales during the week under review; $3,500 per foot was asked. We have nothing of special interest to report relative to this company's mine. The new shaft is down 281 feet.

SAVAGE—has been rather quiet, though the comparatively few shares sold show an advance, opening at $2,600, and gradually rising to $2,750, and closing yesterday at $2,775.

CROWN POINT—has been in marked request at enhanced figures, the sales having been much larger than for some time past, advancing from $1,395 to $1600, buyer 3, receding to $1,400, then selling at $1,460@1,450, and closing at $1,460.

YELLOW JACKET—advanced from $1,300 to $1,350, seller 30, then sold at $1,290, and closed yesterday at $1,325.

GOULD & CURRY—receded from $480 to $450, and closed at $500, buyer 30. We learn that this company's mill continues to run upon ore from its own mine, but the supply is said to be rapidly diminishing.

CHOLLAR-POTOSI—continues in great favor and large sales have been made, opening at $400, advancing to $475@480, and closing yesterday at $499.

OPHIR—has changed hands to a large extent, improving from $345 to $400, then selling at $360@385, and closing at $388.

IMPERIAL—has been well maintained within a range of $278@283, and closed yesterday at $275.

BELCHER—advanced very rapidly from $205 to $355, dropped to $250, then sold at $300, and closed at $310. EMPIRE sold within a range of $185@190....ALPHA obtained $400 per foot....BULLION sold at $32@47, and closed yesterday at $50....OVERMAN advanced from $28 to $42.50, and closed at $35....CONFIDENCE commanned $36@38, then sold at $47@60.

Useful Recipes.

INK FOR WRITING IN RELIEF ON ZINC.—Bichloride of platinum, dry, one part; gum arabic, one part; distilled water, ten parts. The letters traced upon zinc with this solution turn black immediately. The black characters resist the action of weak acids, of rain, or of the elements in general, and the liquid is thus adapted for marking signs, labels, or tags which are liable to exposure. To bring out the letters in relief, immerse the zinc tag in a weak acid for a few moments. The writing is not attacked, while the metal is dissolved away.

AN IMPROVED PUTTY.—This putty will fasten leather, gutta-percha, and similar substances to metals. The preparation is as follows: A quantity of common glue is warmed on the fire, to this is added some gum ammoniac, and the whole stirred up till reduced to one mass, when saltpetre acid is poured in and mixed with the rest. A trial was recently made of 112 pounds of glue, 7 pounds of saltpetre acid, and 7 pounds of gum ammoniac. The composition proved the best known putty among metal binders, because not susceptible to the action of oil.

TO BOIL EGGS.—A celebrated physician gives the following as the best method of boiling eggs: Put the eggs into a pan and just cover them with cold water. When the water has boiled one minute, take off the pan and place it beside the fire for two minutes more. By this process, the white is coagulated, and the yolk is not; thereby an egg has a relish, and becomes very digestible.

GINGER BEER.—Take one pound lump sugar; best unbleached Jamaica ginger, 1 oz.; cream of tarter, ½ oz.; two lemons, boiling water, 1 gallon. Manipulate with frequent stirring, in a covered vessel until barely lukewarm; add 1½ to 2 oz. yeast. Keep in a moderate warm place, so as to excite a brisk fermentation. Next day rack the liquor, and strain through a flannel. Work for another day or two, according to the weather; skim clean and put into bottles.

II. Into every bottle put essence of ginger, 1 drop; simple syrup, ½ oz.; fill with aerated water at the bottling machines.

TO TEST GILDING.—A USEFUL HINT.—It sometimes becomes desirable to test a piece of gilding. Gold leaf or plate may be known from a gold-colored alloy by the following test: Take a solution of common chloride of copper and apply a drop to the gilding; if it is gold, no effect will be discernable; if it is gold alloy or any other brass imitation, a brown stain will instantly be observable.

WATER-PROOF BOOTS.—It is said that a coat of copal varnish applied to the soles of boots and repeated as it dries, until the pores are filled, will make them waterproof, and three times as durable as those not so treated.

COD-LIVER AND CASTOR OILS DEPRIVED OF THEIR NAUSEOUS ODOR AND TASTE.—The *Journal of Practical Medicine and Surgery* states that the addition of the essential oil of bitter almonds to the above oils, destroys the nauseous odor and fishy flavor of the former, and gives to the latter a pleasing perfume and taste. Ten grains of the essential oil are sufficient for three and a quarter ounces of the most offensive cod liver oil, and three drops for three and a half of castor oil.

Origin of Lighting by Gas.

The credit of originating lighting by gas is generally supposed to belong to the English, but there is no doubt that they took the hint from a French source. Phillippe le Bon, an ingenious engineer of roads and bridges in France, in 1785 adopted the idea of using, for the purpose of illumination, the gases distilled during the combustion of wood. He labored a long time at the attempt to perfect his crude invention, and it was not until 1799 that he confided his discovery to the Institute in Paris. In September, 1800, he took out a patent, and in 1801 published a memoir containing the result of his researches. From 1799 to 1802 Le Bon made numerous experiments at Havre, but, as is generally the case with new discoveries, his thermo-lamps met with but little favor from the public, and he finally retired to Versailles, where he eventually died in extreme poverty,

The English soon improved upon his crude idea. In 1804 Windsor patented and claimed the credit of inventing the process of lighting with gas. In 1805, several shops in Birmingham were thus illuminated, and among those who used the new light was Watt, the inventor of the steam engine. The first use of gas in London was in 1816, and it was not until 1818 that this brilliant discovery or invention, really of French origin, was applied in France.—*Am. Review.*

The Labor Question.

GAS AND STEAM FITTERS.

The regular semi monthly meeting of this organizawas held on the 23d ultimo at Military Hall, No. 193 Bowery, President John C. Walsh in the chair. The business was principally of a routine character, the initiation of new members, of whom there were a large number.

JOURNEYMEN PLUMBERS' PROTECTIVE UNION.

A regular meeting of this organization was held on the 23d ultimo at Putnam Hall, corner of Twelfth-st. and Third avenue, the President, Thomas Hughes, in the chair. The first business in order was the reading of communications, among the most interesting of which was from the Boston Plumbers' Union, acknowledging the receipt from this society of a donation of $100. They expect to settle their difficulties at no distant day. A committee of three, consisting of Mr. Hughes, Mr. Savage, and Mr. Burch, was next appointed to represent the society in the Workingmen's Union. The question of fixing a standard rate of wages was next taken up and debated, at the conclusion of which a motion to lay the subject on the table was made which was carried by a vote of 10 to 7.

Miscellaneous Items.

—General Grant has ordered that a company of cavalry shall accompany a number of Professors from Bloomington, Ill., on a scientific tour to the western slope of the Rocky Mountains. The expedition will be absent about three months, and will be furnished with transportation and subsistence.

—The engineers in charge of the new Blackfriars' Bridge, in London, have made a curious discovery. The foundations of the old bridge were found to be established upon an immense heap of bones, fifteen feet below the bed of the Thames. In the gravel and near the clay were found bones of the ox, the sheep, the horse, and a few human remains.

—Careful observations show that it requires about forty-five gallons of water to drive a locomotive and train one mile, under full headway. One gallon will drive it about one hundred and fifteen feet only. It requires one pint for every turn of the driving-wheel; half a pint of water is ejected with every puff of steam.

—The glaciers of the Alps are now mines of wealth and tributaries to luxury—inexhaustable in both respects. They are worked precisely like stone quarries and their product is transported by rail to Paris and other continental cities. Not only so, but they are excavated into galleries, chambers and magnificent saloons. The depths of snow on the surface exclude the sunbeams, but calcium lights shed a brilliant lustre reflected as from a thousand mirrors of glass, and in small apartments fitted up for the purpose, the furniture of a well-appointed parlor invites to cool but not inhospitable repose.

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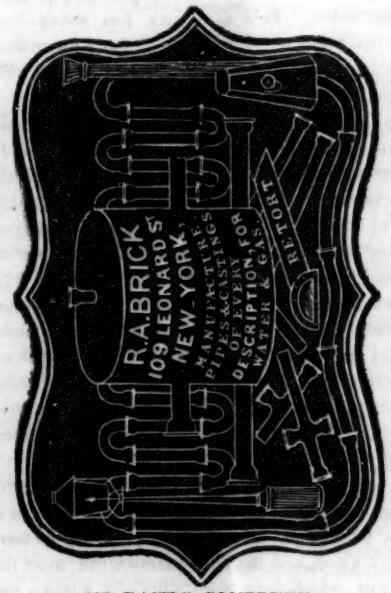

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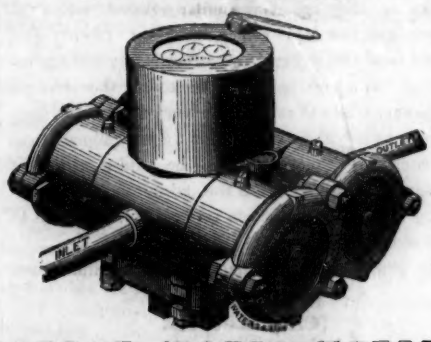

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NOTICE

To Gas Companies and Gas Consumers.

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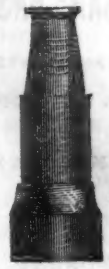

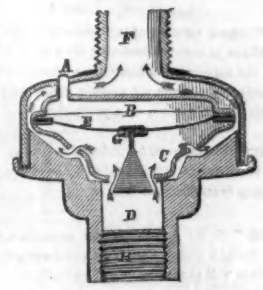

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EDITORS AND PROPRIETORS.

MONDAY, JUNE 3, 1867.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

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☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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To Our Subscribers,

The next number of our Journal will close Volume Eight, and we wish our books to be balanced on the 1st of July.

We have sent out a number of bills due for subscription, and they appear to be either overlooked or neglected. Our subscribers who do not pay promptly should not lose sight of the fact that we cannot afford much time and attention to the collection of so small a sum as three dollars, and although but a trifling matter to them, to us it amounts to considerable in the aggregate. We hope this notice will receive attention.

Oil Wells in Louisiana.

A subscriber writing from New Orleans, under date 20th May, says:

"We have two large companies in Louisiana now boring for oil The pipes have been driven to the depth of 315 feet in one well, the greatest depth, I believe, to which cast-iron tubes have ever been driven. Oil and water is constantly flowing over the top of the well. Oil was struck in considerable quantity, but no rock until now. The other well was sunk to the depth of 215 feet by the use of wrought iron tubing, when sand and rock was found—some oil was met with. Generally, those interested know very little of the manner of boring in Pennsylvania and elsewhere, but all seem confident of ultimate success"

—Professor Marsh, of Yale College, pronounces the fossils recently found at Cohoes, New York, the bones of a female mastodon, of full growth, though comparatively young, and says that the animal must have existed over ten thousand years ago.

Improvement in the Manufacture of Coal Gas.

It is now some months since we stated in our Journal some of the different prominent plans suggested for the improvement in the manufacture of illuminating gas. We then said there were tests and experiments being made under our own eyes, the results of which, if favorable, we proposed giving to the public

We have now before us the prospectus of the National Coal Gas Company. This corporation is organized under the auspices of a highly respectable class of men, several of whom are experts in gas matters, and have the experience of many years in the profession. This Company has consolidated every invention which is deemed of any importance in the manufacture of gas, covered by twelve independent patents.

The Company does not confine itself to the manufacture of illuminating gas, but has apparatus for generating hydrogen gas to be used as a fuel, and for general heating purposes. This we consider quite as important as the advantages to be derived from the illuminating gas, notwithstanding we are fully satisfied that gas companies using the process of this Company will save at least twenty-five per cent. net upon the quantity manufactured. Independent of this saving, the prevention of the deposit of carbon in the retorts, stand pipes and other conduits is equal to at least fifteen per cent. in their durability, besides other considerations in connection therewith.

We anticipate the most favorable results from this new process. Some of the early patents have shown, after long tests, a gain of thirty or forty per cent. gross, and the later patents, the most important of which have been obtained within two years, will add materially to this saving.

The expense of introducing this process into gas works, as they are at present arranged, when the retorts are not less than fifteen by twenty-two inches (and the larger the better) is but trifling, requiring but a few hours to make all the changes necessary. The Company are very liberal, as they propose to pay the expense for these changes, upon the condition that they shall be paid a portion of the saving resulting from the adoption of the process. The improvement is especially applicable to large works.

The offices of the Company are at 22 Pine street.

Clay Retorts.

Notwithstanding the almost universal adoption of Clay Retorts by gas works, there does not appear to be any conclusion as to what size or form will produce the greatest quantity of gas from the same weight of coal.

In Buffalo round retorts are used, in other works the common ⏢ retort of various dimensions. For some time past larger retorts have been ordered, and at the new works at Tarrytown they are putting in retorts 15 by 40 and 15 by 30 inches. We are satisfied that retorts not less than 15 by 22 inches should be used in benches, and are inclined to the belief that a considerably larger size would give better results.

The manufacture of clay retorts has reached a high standard in our country, and each establishment has some peculiarity in the material and construction of its retorts. Mr. Kreischer—who claims to be the patriarch of the manufacture of clay retorts in this country—has preserved a very creditable reputation, his retorts generally giving good satisfaction. Messrs. Gautier & Co. turn out a finished and excellent article. We were shown one of their retorts in a bench of the Manhattan Gas Works, which had been doing regular duty nearly four years. Messrs. J. K. Brick & Co. are manufacturing a first-class article, and they assert a superiority for them over all others in consequence of their possessing a kind of clay which has qualities particularly suited to all the necessary requirements. Messrs Maurer & Weber are manufacturing both plain and enameled retorts. There can be no doubt that a retort well enameled is far superior to a plain one, because it prevents the leakage of gas through the pores of the retort; a waste which is very considerable for some time after new retorts are set.

All these establishments have made extensive additions and improvements in their works lately. Kreischer's new plan of furnaces and kilns in Goerck street, just completed, presents a very interesting and beautiful piece of masonry. Its success is yet to be developed, but would appear to be certain. Their principal works are on Staten Island. The works of Messrs. J. K. Brick & Co. have been entirely remodeled and very much enlarged during the last twelve months, and now appear to be complete in every respect, for the convenient prosecution of their business. It is a remarkable fact that during the entire rebuilding of their manufacturing and kiln house, the ordinary work of the establishment was not interrupted. Messrs. Maurer & Weber have also made large additions to their works, but require yet more room to carry out their business.

A rival has entered the field for the manufacture of clay retorts, both plain and enameled, in the person of Col. John Newkumet, of Philadelphia, who has lately constructed works for this business. He has passed over a year on the continent of Europe, and has returned home well posted as to the experiences of clay retort manufacturers there.

We advertise Messrs. Davis & Chaddock, manufacturers of clay retorts and fire-brick at Chelsea, Mass. Not having seen their works, we do not know how extensive they are. We observe they are agents for the sale of Messrs. J. K. Brick & Co.'s clay retorts, fire-brick and gas house tile, etc.

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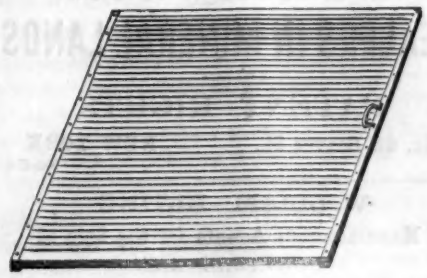

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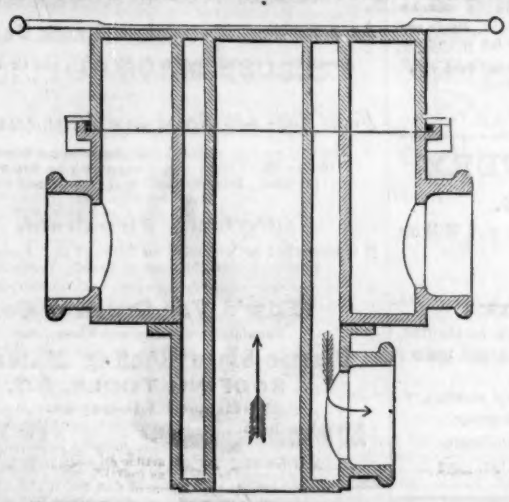

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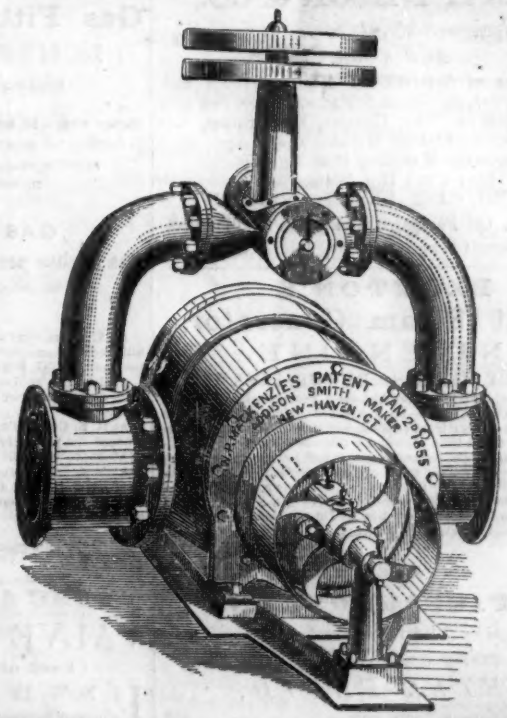

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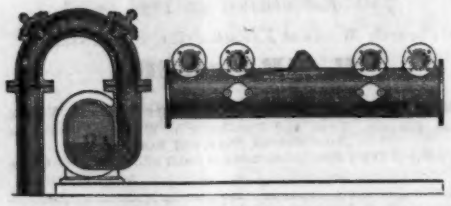

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THE VALUABLE IMPROVEMENT FOR SAVING and otherwise improving the gas, invented by Dr. J. S. Wood, described in the "Gas-light Journal" October 2d, 1866, is now for sale by State or County rights.

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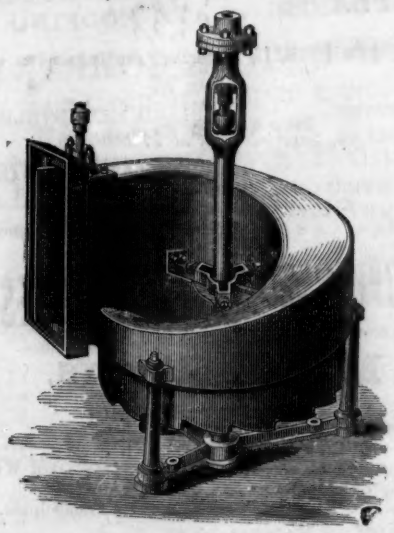
Helical Jonval Turbine Water Wheel,



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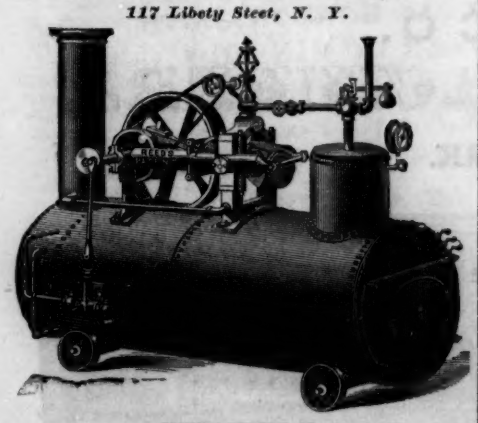

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We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

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Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

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4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 200 cotton to coarse linen thread.

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with so little trouble, makes it equal, if not superior, to six machines combined; for instance. it Binds, Hems, Tucks and Sews on the band at the same time, and inf acc, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

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No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
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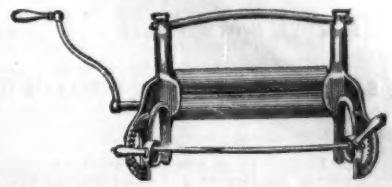
PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $3 to $10 per day

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *no tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and *any* others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

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Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 200 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.

Sample Wringers sent, express paid, on receipt of price. Manufactured and sold, wholesale and retail, by

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Burners for Wood, Coal Oil and Water Gas.

Gas and Lava Burner Tips

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This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

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Continue, as heretofore at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture

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Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality—the number furnished by you to these works is over 5,000.

JOHN C. CRESSON, Engineer;

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of wokmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G S. HOOKEY, Superintendent of the Gas Light Company of Augusta, Georgia.

Messrs. Harris & Brother, Philadelphia. Philadelphia, March 4, 1858.

Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are, gentlemen, very truly, yours, BIRKINBINE & MAGRS.

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Gentlemen—For the last ten years we have used in the Philadelphia Gas Works, meters made in your factory, and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the material used in the manufacture of the same, to be as fine quality as is used in those imported from Europe, or made by any of the manufactur in the United States. Respectfully Yours GEORGE WIEGAND, Inspector of Gas Fittings, Philadelphia

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Burners for Wood, Coal Oil, and Water Gas. Brass and Lava Burner Tips Constantly on Hand.

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Where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

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No. 1,	Seven Octave, round corners, Rosewood, Plain Case,		$275
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Is now in use by many City Water Cos., because of its low price, simplicity, durability, accuracy under any pressure, and (a great advantage) because it runs with less head than any meter used. Manufactured by H. Q. HAWLEY, Albany, N. Y.

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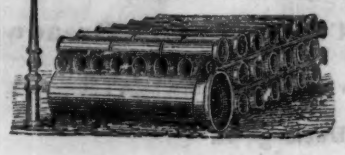

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Patented February 14th, 1860.

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This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather to the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbers.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

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No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
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One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given Terms, invariably CASH on delivery.

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GERMAN LAVA GAS-TIPS

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Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

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PURCHASING

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In Connection with all the Expresses

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Goods purchased at current City prices, and forwarded by Express or as directed.

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Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

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MEXICAN & BRAZILIAN

EXPRESS.

CARRINGTON & CO.

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Express for HAVANA and ISLAND OF CUBA by regular steamships weekly.

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Freights should be sent to our office day before sailing of steamer, with invoice, contents and value.

FINKLE & LYON'S

New Family

SEWING MACHINE

Should be known in

IN EVERY TOWN.

To accomplish this at once and save the expense of a *Travelling Agent*, we offer thus, viz:

Any one sending us orders for two machines shall receive one machine free of charge. This proposition cannot avail after we have appointed a local agent in the town.

We have now completed our *new manufacture* at a cost of some $200,000—introducing *new patents*, and such important improvements, that without fear we are able to offer the following stringent guarantee, viz: After a fair trial, if any purchaser does not prefer the FINKLE & LYON FAMILY SEWING MACHINE to any other, he can return it and have back his money.

This machine has taken many of the HIGHEST PRIZES; *is less complicated than any other first class machine; does a wider range of work without changing; requires no taking apart to clean or oil, no "lessons" to set needle, regulate tension or operate machine.*

Our new Manufacturing Machine is sold on the same terms as the Family Machine.

Please send for a circular with samples of sewing.

Finkle & Lyon S. M. Co.

No. 581 BROADWAY, NEW YORK.

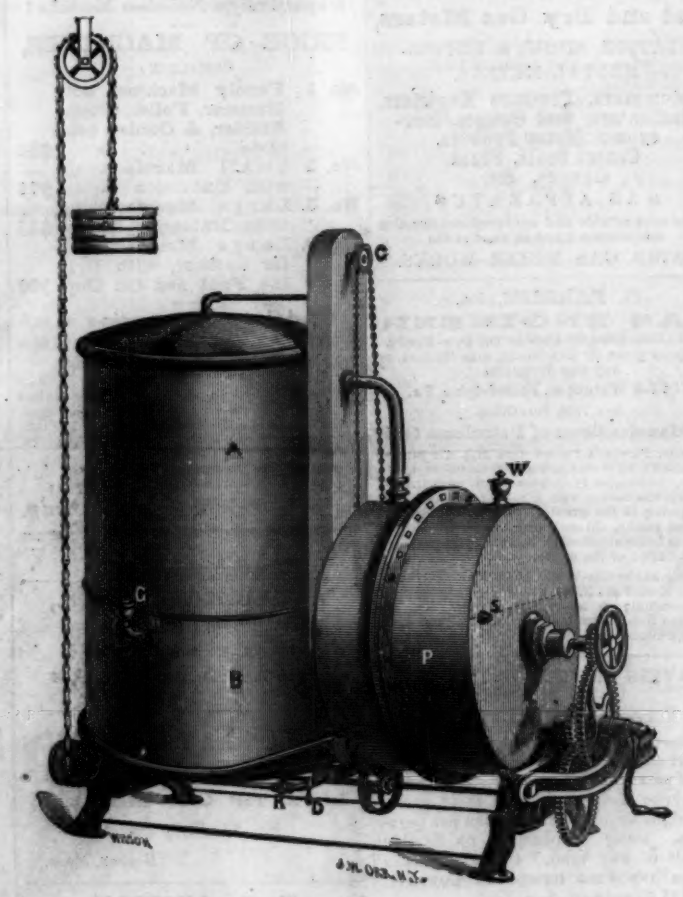
EMPIRE STATE GAS MACHINE,

LEVI STEVENS' PATENT, FOR SUPPLYING,

Dwellings. Stores, Factories and Public Buildings.

THE GAS GENERATED BY THIS MACHINE

Is a mixture of the vapor of hydro-carbon with common air. The mechanical devices employed are such as, from a long experience and critical examination into the nature of the element brought into use, seem best adapted to secure a certain and satisfactory result. GASOLINE, the liquid employed, is the more volatile portions of Petroleum, of a specific gravity of 0.6587. This liquid exposed to the action of this machine is vaporized, and a close mechanical mixture of the vapor with common air is effected. The value of the gas produced, its permanency, its illuminating quality, and freedom from liability to condensation, depend almost entirely upon the perfect and uniform character of this mixture. Hence the great importance of mechanical means adapted to secure all the conditions requisite in a Portable Gas Machine.



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(Boxed and delivered on the cars at the Manufactory.)

No. 1,	$150,	5	Argand Burners.
do. 2,	250,	10	do.
do. 3,	350,	20	do.
do. 4,	450,	35	do.
do. 5,	600,	60	do.
do. 6,	1,000,	125	do.
do. 7,	1,500,	250	do.

This machine will produce the most brilliant and steady light without Fire or Heat, and is warranted to operate in every respect as represented.

The EMPIRE STATE GAS MACHINE is the most SIMPLE and EFFECTIVE MEANS KNOWN FOR PRODUCING GAS WITHOUT HEAT.

Its action is automatic, feeding itself with constant supplies of Gasoline, thus securing steady and uniform supplies of Gas. The gas produced is equal to the best known Illuminating Gas. It is as economical as any other, and is adapted to a wider range of use for Lighting, Heatin and Mechanical purposes. It will maintain its illuminating power under as great a degree of cold as any other. It is free from danger with the ordinary care in using gas. Its remarkably pure and steady light is pleasant for the eye. It renders it easy for persons living remote from street gas pipes to enjoy the luxury of a pure GAS-LIGHT, at a COMPARATIVELY SMALL COST, AND WITH LITTLE TROUBLE.

☞ The public are invited to witness its operations at our store. GASOLINE will be supplied by us, at market prices, or may be obtained from the various other sources of supply now going into operation.

MITCHELL, VANCE & Co., 620 Broadway, New York,

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